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Cooperative Wildlife Research Unit, Ohio State University, Columbus, Ohio

WILDLIFE REVIEW

AN ABSTRACTING SERVICE FOR WILDLIFE MANAGEMENT
ISSUED FOR THE INFORMATION OF COOPERATORS
BY THE
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OHIO COOPERATIVE WILDLIFE RESEARCH UNIT
THE OHIO STATE UNIVERSITY
COLUMBUS 10, OHIO

Bibliography: Birds

Strong, Reuben M. A bibliography of birds, with special reference to anatomy, behavior, biochemistry, embryology, pathology, physiology, genetics, ecology, aviculture, economic ornithology, poultry culture, evolution, and related subjects, Field Museum of Natural History (Chicago, Ill.) Zoological Series, Vol. 25, Part 1, Author Catalogue A to J, pp. 1-464; Part 2, Author Catalogue K to Z, pp. 465-937, 1939. Part 3 containing the subject index is in press. Price for the three parts, postpaid, $11.00.

An outgrowth of the author's original bibliography on bird morphology, this work is largely non-taxonomic and relates especially to anatomy, physiology, ecology, and behavior. Paleontology, parasitology, aviculture, and migration in addition, however, are not ignored. Volume 1 includes a key list of abbreviations for periodicals cited (pp. 17-72), and a list of periodicals not cited but relating to birds (pp. 73-82). In both volumes, symbols indicate libraries in which many of the works listed may be found. A monumental task, well done; completeness, however, was not aimed for and should not be expected. A literally complete bibliography unavoidably would include references of little value.

Bibliography: Ecology

Carpenter, J. Richard. Recent Russian work on community ecology, Journ. Animal Ecology (Cambridge University Press, 200 Euston Road, N. W. 1, London, England. 20 shillings a copy), 8(2), Nov. 1939, pp. 354-386.

History of ecological studies in Russia, statement of present organization for these researches, discussion of concepts and theories, and bibliography of 517 titles.

Classification: Fleas

Fox, Irving. Fleas of eastern United States, Iowa State College Press (Ames), vii+191 pp., 31 pls., Feb. 1940 ($3.00 a copy, postpaid).

The introductory chapter discusses the collection and preservation, morphology and terminology, and life history and control of fleas. The remainder of the book is a systematic treatment, including keys from suborders to species, synonymy, and citations to the literature of all groups, and descriptions, illustrations, and locality and host records for 55 species. This the first comprehensive treatment of American fleas since 1904, should be of considerable value to students of animal diseases.

Conservation

Poe, J. Charles. Wildlife conservation in Tennessee, Educational Publication No. 1 (Dept. of Conservation, Nashville, Tenn.), 14 pp., n. d., mimeographed.

History of the exploitation of natural resources of the State. To be effective, conservation of all of them must proceed simultaneously. National and State organizations for conservation are described and some of their currently available publications listed.

Conservation: Dove, Mourning

Palmer, C. M., Jr. Mourning dove menaced, American Wildlife (Investment Bldg., Washington, D. C. 25 cents a copy), 29(1), Jan.-Feb. 1940, pp. 45-47.

Sketching a background of the fate of the passenger pigeon, the author emphasizes care to preserve the mourning dove. Its desirability as a game bird, its habits, and useful economic status are briefly summarized. Its multiple brood production, prolonging the breeding season past the customary date for the opening of the hunting season, imposes a problem in management which the writer thinks can be solved by education and gradual action.

Conservation: Murre

Johnson, R. A. Present range, migration, and abundance of the Atlantic murre in North America, Bird-Banding (Charles B. Floyd, 210 South St., Boston, Mass. 75 cents a copy), 11(1), Jan. 1940, pp. 1-17, 1 map, 1 table.

Location and size of recent breeding colonies, notes on migration, winter range, and winter populations, especially as elucidated by banding. The total breeding population is some 60,000 birds. Eggers who collected eggs for the Boston market 80 to 100 years ago together with local marauders reduced the murre population about 95.5 percent up to the time that the Canadian Government created sanctuaries for the birds. They are now increasing on the refuges.

Control: Predators

Green, D. D. Controlling predatory animals, American Wildlife (Investment Bldg., Washington, D. C. 25 cents a copy), 29(1), Jan.-Feb. 1940, pp. 35-40, 3 photos.

Predator control in America pursuant to legislation dates from 1630. Its necessity has continued longer in the sparsely settled West than in the East and urgent requests resulted first in investigation of the problem, and in 1914 in a small appropriation by Congress for experiments and demonstrations. A considerably larger allotment the next year enabled the Biological Survey to take over the work along this line that had been carried on by the Forest Service. In that year 14,072 predators were killed. Organization and methods have been improved to handle the problem in 11 western range States totalling 761,000,000 acres, nearly half of which is public domain. In illustration of losses is cited the Forest Service report that in 1936, 78,404 sheep and goats were killed by predators on national forests in the United States during the summer grazing season of about 3 months. Despite control

operations, coyotes seem to be both increasing and spreading. Improved methods are a great need and are being sought. In contrast the control of the wolf, bobcat, bear, and mountain lion is local in character and readily accomplished with adequate personnel. Criticisms of the work are discussed and the results of investigations cited.

Control: Water chestnut

Hamill, J. S. Deadly water chestnut chokes Potomac, Outdoor America (1167 Merchandise Mart, Chicago, Ill. 10 cents a copy), 5(3), Jan. 1940, pp. 4-5, 3 photos.

Spread of the plant, suppression of other vegetation of more value to wildlife, description, illustration, and life history of water chestnut; steps being taken in control.

Cycles: Arctic animals

Chitty, Dennis. Canadian Arctic wild life enquiry, 1937-38, Journ. Animal Ecology (Cambridge University Press, 200 Euston Road, N. W. 1, London, England. 20 shillings a copy), 8(2), Nov. 1939, pp. 247-260, 4 maps, 2 tables.

Third report in this series, the second of which was noticed in WILDLIFE REVIEW, No. 19, April 1939, p. 12. Data are summarized on increase and decrease of lemmings, arctic foxes, and snowy owls, and upon "distemper" among sledge dogs.

Cycles: Hare, Snowshoe

Green, R. G., and C. A. Evans. Studies on a population cycle of snowshoe hares on the Lake Alexander Area. I. Gross annual censuses, 1932-1939, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 220-238, 4 figs., 9 tables.

Authors' abstract: "An intensive study of populations of the snowshoe hare (Lepus americanus) has been pursued since 1931 on the Lake Alexander Area, a tract of about six and one-half square miles in Morrison County, Minnesota. Calculations are based on systematic trapping and banding operations carried on during the months of November through April since 1932. Field observations made before trapping and banding procedures were instituted showed that snowshoe hares were not common on the Lake Alexander Area in 1928. The population gradually increased in the course of the next few years to a maximum calculated population of 500 hares to the square mile in 1935. During the next two years a moderate focal decline in the numbers of hares occurred on some parts of the area. From 1935 through 1938 there was a continuous, sharp decline until the number of hares was only about 10 per cent of the peak population. The beginning of recovery from the decimation was marked by an increase in numbers of hares in 1939 to about twice the population in 1938. These changes in population coincided with parallel changes in numbers of hares observed in other

parts of Minnesota and in Wisconsin and may be considered representative of the periodic fluctuations in population to which these animals are subject. It was estimated that a winter mortality of about 50 per cent occurred during a period of ten weeks in each of two successive years. An analysis of the error of random sampling entailed in calculating yearly populations is presented.'

Diseases and Parasites: Blood parasites

Herms, W. B., C. G. Kadner, P. Galindo, V. Armstrong, and D. F. Armstrong. Blood parasites of California birds, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 25(6), Dec. 1939, pp. 511-512.

Report on examination of 150 birds embracing 30 species of which 41 of 6 species were found infected; records of infection by Plasmodium, Haemoproteus, Trypanosoma, and microfilariae are given, and also a list of the uninfected birds.

Diseases and Parasites: Cestoda, Diorchis

Long, L. Helen, and Nelson E. Wiggins. A new species of Diorchis (Cestoda: Hymenolepididae) from the canvasback, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 25(6), Dec. 1939, pp. 483-486, 1 pl.

D. nyrocae n. sp. from Oklahoma; description, illustration, comparative notes, and list of known species of the genus.

Diseases and Parasites: Cestoda, Oochoristica

Peery, Harold J. A new unarmed tapeworm from the spotted skunk, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 25(6), Dec. 1939, pp. 487-490, 1 pl.

Oochoristica oklahomensis; description, illustration, comparative notes, list of species of the genus from mammal hosts; bibliography of 6 titles.

Diseases and Parasites: Oochoristica

Steelman, Gerald M. Oochoristica whitentoni, a new anoplocephalid cestode from a land tortoise, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 25(6), Dec. 1939, pp. 479-482, 1 pl.

In Terrapene triunguis from Oklahoma; description, illustration, and comparative notes.

Diseases and Parasites: Cestoda, Tatria

Olsen, O. Wilford. Tatria duodecacantha, a new species of cestode (Amabiliidae Braun, 1900) from the pied-billed grebe (Podilymbus podiceps podiceps (Linn.)), Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 25(6), Dec. 1939, pp. 495-499, 1 pl.

From Iowa; description, illustration, comparative notes; key to 5 known species of the genus; bibliography of 6 titles.

Diseases and Parasites: Eimeria

Honess, Ralph F. The coccidia infesting the cottontail rabbit, Sylvilagus nuttallii grangeri (Allen), with descriptions of two new species, Parasitology (Cambridge University Press, 200 Euston Road, N. W. 1, London, England. 18 shillings 6 pence a copy), 31(3), Sept. 1939, pp. 281-284, 3 figs., 1 table.

Brief notes on technique; accounts of 4 species of Eimeria, 3 illustrated, and 2 new (E. maior and E. environ presumably from Wyoming); the table compares characters of 8 species and one variety of the genus; bibliography of 7 titles.

Diseases and Parasites: Gastroenteritis

Waller, E. F. Infectious gastroenteritis in raccoons (Procyon lotor), Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 96(755), Feb. 1940, pp. 266-268.

Account of an infectious malady of captive raccoons in Iowa; course of the disease, necropsies and experimental studies of it. It was similar to, if not identical with, gastroenteritis of cats, the causative organism of which is Escherichia coli communior.

Diseases and Parasites: Malaria

Gambrell, Elizabeth. Avian malaria, The Oriole (Emory University, Ga.), 4(4), Dec. 1939, pp. 57-58.

Popular article describing the disease and its transmission and reviewing recent findings as to malaria in birds of the United States. It is suggested that the malady is most destructive to young birds.

Diseases and Parasites: Nematoda, Dracunculus

Benbrook, E. A. The occurrence of the guinea worm, Dracunculus medinensis, in a dog and in a mink; with a review of this parasitism, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 96(755), Feb. 1940, pp. 260-263, 1 photo.

Review of literature, of which 23 titles are cited; wild animals from which the parasite (an enormous nematode) have been reported include the fox and mink. Description of the worm, infections by it, and treatment.

Diseases and Parasites: Nematoda, Skrjabingylus

Hill, William C. The nematode Skrjabingylus chitwoodorum n. sp. from the skunk, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 25(6), Dec. 1939, pp. 475-478, 1 pl.

In Mephitis and Spilogale from Oklahoma; description, illustration, comparative notes.

Diseases and Parasites: Relapsing fever

Davis, Gordon E. Ornithodoros parkeri: distribution and host data; spontaneous infection with relapsing fever spirochetes, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 54(29), July 21, 1939, pp. 1345-1349, 1 table.

Records of collection, giving locality, date, and host animal (ground squirrels, prairie dogs, rabbits, weasel, deer mouse). Specimens from 3 localities were found infected with relapsing fever spirochetes, but no transmission to man has as yet been demonstrated.

Diseases and Parasites: Selenium poisoning

Twomey, Arthur C., Sarah J. Twomey, and Loring R. Williams. Selenium and duck sickness, Science (Grand Central Terminal, New York, N. Y. 15 cents a copy), 90(2346), Dec. 15, 1939, pp. 572-573, 1 table.

Analyses of the livers of birds dying from duck sickness in Utah revealed definite traces of selenium; those for a check series from Pennsylvania did not. Selenium poisoning was also experimentally demonstrated. The symptoms are the same as those of botulinus infection. The authors are of the opinion that selenium is an important factor in western duck sickness in the areas studied.

Diseases and Parasites: Tick, Gulf Coast

Hixson, Homer. Field biology and environmental relationships of the Gulf Coast tick in southern Georgia, Journ. Economic Entomology (E. N. Cory, College Park, Md. 75 cents a copy), 33(1), Feb. 1940, pp. 179-189, 2 figs., 7 tables.

Amblyomma maculatum, not otherwise especially injurious, creates conditions favoring screw-worm infestation of the ears of domestic animals. The literature of the species, 8 titles of which are cited, is reviewed, and the life history of the tick fully discussed. Besides livestock, the known hosts include 5 species of mammals and 11 of birds. Birds are more susceptible to infestation than are the mammals. Details are given of the findings with respect to wild hosts.

Diseases and Parasites: Ticks

Jellison, William L. The burrowing owl as a host to the argasid tick, Ornithodorus parkeri, U. S. Public Health Reports (Supt. of Documents, Washington, D. C. 5 cents a copy), 55(5), Feb. 2, 1940, pp. 206-208.

Nine of 18 burrows investigated in Washington yielded specimens of this tick previously known from a variety of small mammal hosts.

Diseases and Parasites: Trematoda, Diplostomulum

Kent, George C., Jr. A new trematode: Diplostomulum sirenis, n.sp., Journ. Washington Acad. Sci. (H. S. Rappleye, U. S. Coast and Geodetic Survey, Washington, D. C. 50 cents a copy), 30(2), Feb. 1940, pp. 87-91, 1 fig., 1 table.

From Siren lacertina, Nashville, Tenn.; description, measurements, illustration, comparative notes; bibliography of 6 titles.

Diseases and Parasites: Trematoda, Leptophyllum

Byrd, Elon E., and Robert L. Roudabush. Leptophyllum ovalis n. sp., a trematode from the brown water snake, Journ. Parasitology (Lancaster, Pa. $1.50 a copy), 25(6), Dec. 1939, pp. 471-473, 1 fig.

In Natrix taxispilota from Florida; description, illustration, comparative notes.

Diseases and Parasites: Trematoda, Maritrema et al.

Rankin, John S., Jr. Studies on the trematode family Microphallidae, Travassos, 1921. III. The genus Maritrema Nicoll 1907, with description of a new species and a new genus, Maritreminoides, Amer. Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 22(2), Sept. 1939, pp. 438-451, 1 pl.

The hosts are chiefly shore birds, gulls, and ducks. The paper gives a historical review of the group and comparative descriptions of the species of the genera named, with notes on their hosts and the localities from which they are known. The new genus is based on Maritrema nettae Gower from the goldeneye and lesser scaup and includes two other species. Bibliography of 25 titles.

Diseases and Parasites: Tularemia

Whitehurst, M. Morris. Tularemia (rabbit fever), Maryland Conservationist (514 Munsey Bldg., Baltimore, Md.), Winter Issue 1940 (Feb.), 17(1), pp. 20-22, 2 photos.

An introductory statement on pp. 19-20 comments on the prevalence of tularemia in Maryland, tabulates by counties the cases reported in 1937-38 (18), and 1939-39 (36), and discusses proposed legislation for control of the sale of rabbits. The main article refers briefly to history of knowledge of the disease, describes symptoms, lesions, and methods of transmittal. A high proportion of the cases are among marketmen who handle large numbers of rabbit carcasses. Sportsmen are relatively seldom affected and they may reduce the incidence of the disease by taking suggested precautions in connection with hunting and dressing rabbits.

Diseases and Parasites: Of cottontail

Clancy, C. F., E. Jungherr, and P. R. Sine. Internal parasites of cottontail rabbits in Connecticut, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 162-168, 2 charts, 1 table.

Authors' abstract: "As part of an ecologic study of the cottontail by the Connecticut Cooperative Wildlife Research Unit, an internal parasite survey of 342 cottontail rabbits showed 85% to be infested as follows: Eimeria sp. 63%, Obeliscoides cuniculi 40%, Cittotaenia variabilis 32%, Cysticercus pisiformis 28%, and Passalurus ambiguus 6%. Distribution of parasites was apparently uniform throughout the state in both hosts (eastern cottontail, Sylvilagus floridanus mallurus and New England cottontail, Sylvilagus transitionalis) except that Passalurus ambiguus was found only in the New England cottontail, primarily in eastern Connecticut. Parasitism by Obeliscoides was lowest during the winter months."

Diseases and Parasites: Of gallinaceous birds

Durfee, Thomas, and M. Wolfe Lerner. A coliform intermediate from diseased quail, Journ. Amer. Veterinary Medical Assoc. (221 N. La Salle St., Chicago, Ill. 75 cents a copy), 96(755), Feb. 1940, pp. 245-246.

Report on an investigation of game farm material, presumably from New Jersey. Authors' summary: "Investigation of the bacterial flora in quail dying from an unknown disease has been carried out. Strains of organisms of the Proteus, Pseudomonas, Alcaligenes, Aerobacter, and Escherichia genera have been isolated and identified. A strain of Escherichia freundii has been investigated. A shifting of its biochemical reactions was observed. This organism appears to be the cause of the unknown disease of quail, Hungarian partridge, and pheasants."

Diseases and Parasites: Of gallinaceous birds

Wehr, Everett E. Nematodes of domestic fowls transmissible to wild game birds, Veterinary Medicine (7632 S. Crandon Ave., Chicago, Ill. 50 cents a copy), 35(1), Jan. 1940, pp. 52-58.

Disastrous experience has made it plain that these two types of birds should not be reared together or even in close proximity to each other. Gapeworms, crop worms, stomach worms, and intestinal worms are discussed (as to hosts, life history, control, etc.) and references to 20 titles of pertinent literature given. Apparently some of the poultry parasites reported to have been found in game birds are of different species. The situation calls for further study but enough is known to enable breeders to guard against losses from these parasites.

Ecology: Beaver

Carr, William H. Beaver and birds, Bird-Lore (1006 Fifth Ave., New York, N. Y. 30 cents a copy), 42(2), March-April 1940, pp. 141-146, 3 photos.

Ecological changes following restoration of beavers to the Palisades Interstate Park; the animals increased from 3 pairs introduced in 1920 to about 150 individuals in 1939. Water and soil conservation and creation of habitat for many forms of wildlife are among the benefits enumerated.

Ecology: Census methods

Jackson, C. H. N. The analysis of an animal population, Journ. Animal Ecology (Cambridge University Press, 200 Euston Road, N. W. 1, London, England. 20 shillings a copy), 8(2), Nov. 1939, pp. 238-246, 1 fig.

Based on work with tsetse-flies in East Africa. A random sample of individuals is marked; at some later time a random sample is caught and examined; the proportion of recaptures to the total taken in the second catch ought to be the same as the proportion initially marked to the total population. On this principle the data are elaborated, allowance being made for the factors of birth, death, and migration. Under certain conditions the absolute number of animals in a population can thus be calculated.

Ecology: Pine seed survival

Gemmer, Eugene W., T. E. Maki, and R. A. Chapman. Ecological aspects of longleaf pine regeneration in south Mississippi, Ecology (Prince and Lemon Sts., Lancaster, Pa. $1.50 a copy), 21(1), Jan. 1940, pp. 75-86, 1 fig., 10 tables.

The paper contains references to bird and rodent destruction of pine seeds. Depredations increased during a cold spell when insect food was less available. "Field tests show that longleaf pine seed must be protected from birds and (to a lesser extent) from rodents, if a stand of seedlings is to be established. In artificial reforestation, the use of small wire tubes, mulches, and the mechanical drill seeder gave promising results." On burning, the authors concluded that "the protective value of the rough was more important than the favorable soil conditions supplied by burning or cultivating."

Ecology: Populations

Thompson, W. R. Biological control and the theories of the interactions of populations, Parasitology (Cambridge University Press, 200 Euston Road, N. W. 1, London, England. 18 shillings 6 pence a copy), 31(3), Sept. 1939, pp. 299-388, 1 fig.

Historical survey of the subject covering entries in a closely-set 6-page bibliography. Discussion of the general theories of natural control, the problem of random searching, and the mathematical formulation of the interaction of populations. The author is a competent mathematician and had much to do with the building of mathematical theory of parasite-prey relationships, but it is clear that he thinks the swing to mathematical treatment of populations has gone too far. His views are briefly summarized in the following extract:

"some workers in the field of biological control have apparently decided that the mathematical theories may be considered in some sense as a substitute for observation; that the study of them will reveal to us the facts of nature; and that we may be guided by them in practical work. Entomologists untrained in mathematics might find these conclusions rather discouraging since they would be obliged either to accept on trust principles they do not understand and cannot justify, or to undertake a lengthy course in difficult mathematics. The present writer is convinced that this view is mistaken; that the mathematical theories, though a natural and useful development, have not the significance attributed to them; that none of the theories so far produced can be considered as an adequate representation of events in nature, while the theory at present dominant, being of a form derived from physical phenomena, is particularly inapplicable to the behaviour and interaction of living organisms; and that observation and experiment are still the only safe basis for practical operations in economic biology."

Ecology: Populations, birds, England

Chapman, W. M. M. The bird population on an Oxfordshire farm, Journ. Animal Ecology (Cambridge University Press, 200 Euston Road, N.W. 1, London, England. 20 shillings a copy), 8(2), Nov. 1939, pp. 286-299, 5 tables.

Discussion of 86 counts on an area of 125 acres. The bird population of hedges fluctuated less than those of arable land, and summer occupancy was more stable than that of winter. The average total population was 2 birds per acre.

Cited here mainly to reassure those who are under the impression that birds are more common in Great Britain than in the United States and that, therefore, something must be wrong with our policies or with the environment. The population figure cited is just the same as has been reached in numerous Usonian bird counts.

Ecology: Populations, vole, meadow

Blair, W. Frank. Home ranges and populations of the meadow vole in southern Michigan, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 149-161, 1 fig., 7 tables.

Author's abstract: "Home ranges and populations of the meadow vole (Microtus p. pennsylvanicus) were studied by a live-trapping method on 20.4 acres of grassland in Livingston County, Michigan. The sex ratio was about even. Peaks of breeding activity were found in spring and fall. A high rate of mortality in young voles was indicated. Adult ♀♀ had average home ranges of 0.19 ± .02 acre in moist, and 0.28 ± .03 in dry, grassland. Adult ♂♂ had average home ranges of 0.31 ± .02 acre in moist, and 0.50 ± .07 in dry, grassland. The ranges of ♂♂ were significantly larger than those of the ♀♀ in both situations. The greatest average number of voles per acre was 11.9 in early July, 1938, in moist grassland. Voles were very scarce in the summer of 1939."

Ecology: Roadside erosion

Smith, Charles C. Wildlife and roadside-erosion in central Oklahoma, Proc. Okla. Acad. Sci. (A. O. Weese, Editor, University of Oklahoma, Norman), 19, 1939, pp. 31-35, 2 tables.

Factors affecting erosion and the composition of vegetation along roadsides are discussed in their relation to wildlife. From author's summary: (1) Roadside erosion affects not only land plants and animals but also aquatic life because of the filling of lakes and streams and the clouding of the water by the soil carried to them by roadside ditches. Silt in the water interferes with the respiration of aquatic animals and diminishes the light available to them; (2) roadside vegetation serves as a source of food and cover for wildlife during a large part of the year, especially in closely farmed regions; (3) almost every species of plant found growing on the roadside serves as a source of food or provides protective and nesting cover; (4) the occurrence of excessive roadside-erosion can be attributed to methods of construction and maintenance of roads. Bibliography of 10 titles.

Economics

Slaybaugh, Nelson E. Investing the sportsman's dollar, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(1), April 1940, pp. 5-8, 1 photo, 1 graph, 6 tables.

Analysis of expenditures, and what is perhaps of more general interest estimate of returns from wildlife. Meat value of game in 1938 more than 10 million dollars and annual value of raw furs $750,000. Payment of bounties amounted to 4.83 cents on the dollar.

Education: Arbor Day and Bird Day

Authors. Arbor Day and Bird Day, Bulletin to the Schools, University of the State of New York (Albany. 10 cents a copy), 26(7), March 1940, pp. 225-264, illus.

Educational suggestions and brief popular articles. Those of most probable interest to wildlife managers are "A community bird sanctuary," by Walter Elwood (pp. 236-237, 261, 2 photos), and "Do birds get sick?" by Carlton M. Herman (pp. 246-247).

Education: Bird book for children

Van Coevering, Jack. Real boys and girls go birding (J. B. Lippincott Co., Philadelphia, Pa. $2.00 a copy), 150 pp., illus., 1939.

Stories of field experiences of children and their mentors in observing and photographing wildlife, chiefly birds. A list of recommended books, and a brief directory of conservation and ornithological societies are appended. The book is fully illustrated by photographs. The author names a number of prominent wildlife students who have read the text to verify statements of fact.

Education: Birds of Tennessee

Craig, John L., et al. Birds of Tennessee in verse and story (Dept. of Conservation, Nashville, Tenn. 20 cents a copy), 76 pp., illus., n. d.

The Educational Service of the Department of Conservation prepared general chapters for this booklet on the economic value, habits, and protection of birds, and on methods of attracting them. The author cited contributes popular accounts of 30 common birds, each accompanied by eight lines of verse, a form for entering observations, a description of the bird and a frame for a colored illustration to be pasted in. These pictures, in separate enclosures accompanying the publication, were donated by the Church and Dwight Company from its well known series. They are from paintings by L. A. Fuertes.

Education: Conservation

Lumley, Ellsworth D. Shortage of waterfowl, Emergency Conservation Committee (734 Lexington Ave., New York, N. Y.) Conservation Unit 1, 3rd edition, completely revised, 26 pp., illus., 1940.

Introduction by Edward A. Preble. Discussion of danger of waterfowl extermination, history of protection, the refuge program, contributory causes of waterfowl depletion, and how the waterfowl may be saved. The leaflet, intended for use in teaching, contains suggestions on Research for Advanced Students, Class Assignments for Younger Students, and a bibliography of 30 titles.

Education: Conservation

Nagel, Werner O. Objectives for the education of youth in wildlife conservation, School and Community (Missouri State Teachers Association, Columbia, Mo. 25 cents a copy), 26(3), March 1940, pp. 108-111.

Conservation education being in the developmental stage is in need of standards. Weaknesses at present manifest include: "(1) Failure to recognize and plan according to some fundamental objectives of conservation education for youth; (2) failure to recognize two distinct youth groups [producers and consumers], and to provide instruction suited to the needs of each group; (3) lack of standards for use in planning effective activities." "The youth program should develop attitudes. x x x It should convince the youth of the value of conservation to him and to society, and of his responsibility in the matter. It should show him how to get the desired results. To be effective, the program must be of a type to provoke thought, promote discussion, and stimulate activity." The paper is a well-knit exposition of how to attain these objectives. It includes itemized standards of activities for the producer and consumer groups, and for the instructor.

Education: Conservation in 4-H clubs

Harrill, L. R. Wildlife conservation in the 4-H program, 4-H Horizons (10 Ferry St., Concord, N. H.), 2(4), Dec. 1939, pp. 3, 70, 2 photos.

Outline of activities of the clubs in North Carolina in farm environment and wildlife surveying, and study of soil conservation, forestry, and wildlife projects.

Education: Forest game management

Hosley, N. W., et al. Report of Committee on Game Management with reference to forestry, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 38(2), Feb. 1940, pp. 137-139.

Relates mainly to Civil Service examinations and makes suggestions as to correlation of these tests with teaching in wildlife management.

Food Habits

Farnham, Rouse. Game food plants, Alabama Farmer (Auburn, Ala.), 20(6), March 1940, pp. 16, 22.

Discussion by plant groups of important sources of food for the bobwhite and mourning dove, with briefer mention of the diet of the wild turkey, cottontail, and gray squirrel.

Food Habits: Pheasant damage

Langenbach, John R. Crop damage by ringneck pheasants, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(12), March 1940, pp. 10-11, 2 photos, 2 tables.

Reports of damage to corn and tomatoes seemed numerous enough to demand investigation. This article relates to inquiry into tomato depredations in 1939. It was found that losses due to rot, sun scald, insects, and culling in a total of 10 categories were all in excess of those caused by pheasants. The findings are tabulated to show the percentage of green, red, and all fruits damaged, the average losses per ton and their financial significance.

Food Habits: Utilization of fungi

Diehl, William W. Endogone as animal food, Science (Lancaster, Pa. 15 cents a copy), 90(2341), Nov. 10, 1939, p. 442.

Notes on the finding of the small truffle-like fructifications of this fungus in the stomachs of 3 species each of shrews and mice.

Food Habits: Of bobcat

Stebler, A. M. 'Cats have their cycles, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 9(6), March 1940, p. 11.

Data on bounty payments indicate considerable variation in the bobcat population from year to year, whether due to cycles or to control pressure is uncertain. Analyses of material thus far collected for food habits studies showed small mammals to be of most frequent occurrence, with hares and rabbits second, deer (mostly carrion) third, and birds (probably also largely carrion) fourth.

Food Habits: Of bob-white

Warner, S. R. Some quail food plants of southeastern Texas, Agricultural and Mechanical College of Texas (College Station) Agr. Expt. Station Prpgress Report 382A, 9 pp., 1 map, 2 tables, mimeographed, Jan. 1940.

Summary of valuable seasonal foods, and table (occupying 6 pages) giving a classified list of quail food plants with notes on their value, time of seeding and fruiting, occurrence on grazed or ungrazed areas, and on various soils.

Food Habits: Of chipmunk, Tahoe

Baysinger, Vorlin G. Chipmunk feeding on white fir aphids, Yosemite Nature Notes (Yosemite National Park, Calif.), 19(3), March 1940, pp. 19-20, 1 fig.

Field observation; the insect, Cinara occidentalis.

Food Habits: Of deer, white-tailed

Pearson, Allen M., and Carey S. Burnett. Deer food in the Black Warrior National Forest, Alabama Game and Fish News (Alabama Dept. of Conservation, Montgomery), 11(8), Feb. 1940, pp. 3-4, 1 table.

Report on analyses of the contents of 19 stomachs collected in December. The principal items are tabulated as to volume and frequency of occurrence and all foods identified are mentioned in the text. Acorns and oak browse comprised about half of the total bulk of food; other important elements were fruits and browse of greenbriers and sumacs. Selective timber cutting to keep the canopy somewhat open is recommended to encourage the growth of valuable food plants.

Food Habits: Of gallinaceous birds

Kelso, Leon. Plant foods of upland game birds, Oologist (R. M. Barnes, Lacon, Ill.), 56(11), Nov. 1939, pp. 122-132; 56(12), Dec. 1939, pp. 140-144.

Discussion by families of the more important foods based on the writer's studies while he was a member of the Biological Survey. Author's summary: "(1) The Grouse are more generalized in their vegetable diet, consuming more stems, buds, leaves, fruit and nuts than the Quails. The Quails eat more seeds than do Grouse; (2) in general the Rosaceae are the most important plant family in the food of the Grouse; (3) the Leguminosae are the most important plant family in the diet of Quail and Partridges; (4) the availability of soft fruits is evidently an important factor in the health and survival of juvenal Quail and Grouse."

Food Habits: Of grouse

Anon. Grouse crop investigation, Wisconsin Conservation Bulletin (Wisconsin Conservation Dept., Madison), 5(3), March 1940, pp. 23-24.

Preliminary reports on analyses of 10 crops of greater prairie chickens (1), 40 of sharp-tailed grouse (2), and 259 of ruffed grouse (3). Leading food items were, respectively, for: (1) corn, birch catkins, dandelion leaves, groundcherries, and wintergreen berries; (2) grasshoppers and clover leaves; and (3) clover leaves, birch catkins, birch buds, dandelion leaves, and grasshoppers.

Food Habits: Of kite, white-tailed

Hawbecker, Albert C. The nesting of the white-tailed kite in southern Santa Cruz County, California, The Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 42(2), March-April 1940, pp. 106-111, figs. 29-30.

Observations made at 4 nests. Compact pellets were cast of which about 180 were examined. Meadow mice were the overwhelmingly predominant food item. Four other rodents and one rabbit also were identified. Irregularities in kite nesting may be explained by variations in the availability of meadow mice.

Food Habits: Of lizards

McCauley, Robert H., Jr. Notes on the food habits of certain Maryland lizards, American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 22(1), July 1939, pp. 150-153.

Based on examination of the alimentary content of representatives of 5 species.

Food Habits: Of merganser, American

Lagler, Karl F. Submarine fisherman, Hunting and Fishing (350 E. 22nd St., Chicago, Ill. 5 cents a copy), 17(4), April 1940 (March), pp. 13, 20-21, illus.

Popular article based on the findings of the investigation abstracted under Salyer and Lagler (below). The merganser feeds largely on trout, taking many of legal size, but damage can be controlled by driving the birds from trout streams to waters where there is little opportunity for them to do damage.

Food Habits: Of merganser, American

Salyer, J. Clark, II, and Karl F. Lagler. The food and habits of the American merganser during winter in Michigan, considered in relation to fish management, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 186-219, 2 pls., 2 charts, 17 tables.

Authors' abstract: "Areas of maximum autumn and spring concentrations for the American merganser (Mergus merganser americanus) in Michigan are the waters margining the northern half of the Lower Peninsula. During unusually cold or prolonged winters when these waters freeze over, large numbers of mergansers are forced onto inland waters, frequently trout streams. The food of 345 specimens from all types of fishing waters showed that the species at times on trout streams constitutes a serious menace to the sport fishery whereas on other natural waters it is either innocuous or beneficial. 'Merganser drives' are described as a means for controlling concentrations on trout streams. Mechanical devices which exclude or frighten mergansers are adequate for protecting fishes in rearing ponds. Feeding is largely diurnal and by sight; one-third to one-half of the body weight is estimated as the average daily food consumption of wintering birds. Because of their food and habits, the red-breasted (Mergus serrator), and hooded (Lophodytes cucullatus), mergansers are considered to be of no importance to fish management in Michigan."

Food Habits: Of muskrat

Butler, L. A quantitative study of muskrat food, Canadian Field-Naturalist (582 Mariposa Ave., Rockcliffe Park, Ottawa, Canada. 25 cents a copy), 54(3), March 1940, pp. 37-40, 3 tables.

Food plants of a marsh near Mafeking, Manitoba, are listed in the order of their importance, and their percentage consumption during the summer months tabulated. Bulrush, cattail, sweetflag, and sedge lead. From feeding experiments, the amount each of 7 species of plants consumed per day was calculated. Counts of the stands of the herbs in the marsh were used in estimating their carrying capacity per acre. Amounts eaten varied from 20 to 128 stems or plants and carrying capacity from 3 to 26 muskrats per acre.

Food Habits: Of opossum

Allen, Durward L. Nobody loves the 'possum, Michigan Conservation (Michigan Dept. of Conservation, Lansing), 9(6), March 1940, pp. 5, 10, 2 photos.

The possum is prolific, adaptable, and omnivorous. It preys to some extent upon eggs, including those of pheasants and wild ducks, raids poultry at times, but feeds more upon carrion, and takes also fruits and grain, seeds and grass, insects and worms--almost anything edible. In Michigan the species seems to be nearing the northern limit of occupiable range, as the animals lose the tips of their ears and tails by freezing.

Food Habits: Of owl, barn

Davis, Wm. B. Mammals compose more than 92 percent of food of the barn owl in Texas, Texas Game, Fish, and Oyster Commission (Austin) Monthly Bulletin, 3(2), Jan. 1940, p. 6, 1 fig.

List of animals identified from a collection of pellets that yielded 542 food items. Percentage representation by groups was: mammals, 92.3; non-game birds, 4.1; game birds, 1.1; and insects, 2.5.

Food Habits: Of owl, great horned

Fitch, Henry S. Some observations on horned owl nests, The Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 42(1), Jan.-Feb. 1940, pp. 73-75.

Attempted counts of the population gave results around 6.6 birds per square mile. Nesting sites and nests are described and their occupancy briefly recorded. The prey brought to 5 nests is listed; it consisted chiefly of rabbits and large rodents: wood rats, kangaroo rats, pocket gophers, and ground squirrels. No birds were included.

Food Habits: Of pheasant

Munro, J. A., and Stanley Saugstad. The ring-necked pheasant. Fall and winter feeding habits in southeastern North Dakota, North Dakota Agr. Expt. Sta. (Fargo) Bimonthly Bul., 2(4), March 1940, pp. 7-8, 3 tables.

Tabulation of the frequency of occurrence of food items in an undisclosed number of crops and gizzards collected in the fall of 1936, winter of 1937, and fall of 1938, and also of percentages by weight of the principal foods taken in 1938. "The pheasant subsists largely upon waste grains, corn and wheat principally, weed seeds, wild fruits, and insects." Table 3 shows the maximum number of each of several kinds of foods taken by individual birds; largest item: 11,540 seeds of pigeon grass.

Food Habits: Of quail, California

Glading, B., H. H. Biswell, and C. F. Smith. Studies on the food of the California quail in 1937, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. .75 cents a copy), 4(2), April 1940, pp. 128-144, 2 pls., 2 figs., 3 tables.

Authors' abstract: "A bio-ecological study was made of the food habits of the California quail (Lophortyx californica) in relation to food materials available to them in the calendar year 1937, at the San Joaquin Experimental Range in Madera County, California. A wide discrepancy was found between the relative amounts of certain items present in the plant cover and the proportions in which they were taken by the quail. Some species, though sparse in the plant cover, e.g. Trifolium spp. and Lupinus bicolor, made up a large percentage of the quail diet, whereas, other common species, e.g. Bromus spp., contributed only small percentages of the quail food. Other species, e.g. Erodium spp., were common both in the quail diet and the plant cover. An expression developed to show 'desirability' for various food items is as follows: Desirability Coefficient = $\frac{\text{Per cent of Diet X Per cent of Frequency.}}{\text{Per cent of Forage Composition}}$ Leaves form the bulk of the diet during the rainy winter season and seeds during the dry summer. The birds did not make use of summer greens such as Hemizonia virgata leaves, but relied on open watering places as sources of moisture. Food shortage is not considered to be a management problem on this area in years of normal rainfall. Animal food, largely insects, made up less than .5% of the annual diet and were taken mostly by laying females."

Food Habits: Of rabbit, European

Southern, H. N. Coprophagy in the wild rabbit, Nature (St. Martin's St., London, W.C. 2, England. 1 shilling a copy), 145(3668), Feb. 17, 1940, p. 262.

Supplementing the paper by Madsen (abstracted in WILDLIFE REVIEW, No. 24, Nov. 1939, p. 21), the author reports several observations on coprophagy.

Food Habits: Of turtles

Lagler, Karl F. A turtle loss?, American Wildlife (Investment Bldg., Washington, D. C. 25 cents a copy), 29(1), Jan.-Feb. 1940, pp. 41-44, 2 photos, 1 diagram.

Summary of investigation of food habits of 6 species of turtles in Michigan. Most space is devoted to snapping turtles, 186 stomachs of which were examined. The food contained in those"was made up as follows: one-third water plants, the second third, game fishes, and the last third, dead fishes, and other carrion, insects, crayfishes, snails, and clams." The probable loss of game fishes to snappers is estimated at 1 fish per acre daily. This is not enough in itself to determine the quality of the fishing. In some waters, "reduction of the numbers of sub-legal fishes by this turtle and other fish predators is beneficial to the angler" in concentrating the rather fixed quantity of fish the water can produce into a smaller number of large fishes. Turtles compete for food with fishes but do much useful scavenging. The problem varies with the water and should be investigated before action is taken. At hatcheries, summary removal is warranted; a trap is illustrated and its use described.

Food Habits: Of weasel, mountain

Baysinger, Verlin G. Mountain weasel catches golden-mantled ground squirrel, Yosemite Nature Notes (Yosemite National Park, Calif.), 19(3), March 1940, pp. 22-23.

Food Habits: Of weasel

Lippincott, Joseph W. I trap no more weasels, Pennsylvania Game News.(Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(12), March 1940, pp. 6, 25, 4 photos.

Observations convinced the writer that weasels prey far more on mice, rats, and ground and red squirrels than upon larger game and he recommends their protection.

Life Histories: Dove, White-winged

Neff, Johnson A. Range,population, and game status of the western white-winged dove in Arizona, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 117-127.

Author's abstract: "The western white-winged dove (Melopelia asiatica mearnsi) is an important game species in Arizona. To obtain information needed for its management, studies of the life history of the species were begun in 1938; this article combines observations of the 1938 and 1939 seasons. Many of the foods taken by white-wings are listed; fruits of the giant cactus (Carnegiea gigantea) are the most favored. The known range of the species is extended somewhat to the northward, and to an elevation of 6,400 feet. Dates of arrival in spring and of departure in autumn are presented. Distribution and density of summer populations are discussed and their relation to food and water is shown. The flocking habits of the species make it especially susceptible to concentrated heavy shooting and frequently whole flights are decimated. Age analysis of 1,684 birds in hunters' bags showed 33-1/3% adult and 66-2/3% juvenile doves. Heavy shooting is more influential in causing early migration to Mexico than are violent storms. The general population trend has been consistently downward and vigorous protective measures are recommended."

Life Histories: Elk

Young, Vernon A., and W. Leslie Robinette. A study of the range habits of elk on the Selway Game Preserve, University of Idaho (Moscow) Bul., 34(16), 48 pp., 3 figs., 5 tables, Dec. 1939.

Review of pertinent literature of which 6 titles are cited. The methods of the investigation, and topography, climate, and biotic history of the study area are described. Elk characteristics and habits are detailed with special attention to calf development, feeding, and habits. The number of calves is equal to about 80 percent of that of the cows. Forage and palatability studies were featured and the results are presented in tabular form. Key species for the summer range are: Salix spp., Acer glabrum, Bromus carinatus, Elymus glaucus, and Carex geyeri. The last-named because of its great abundance and high palatability is the most important herbaceous forage species. Besides the plants named, Amelanchier alnifolia, Sorbus scopulina, Prunus emarginata, and Ponstemon pinetorum also are especially valuable. Palatability varies considerably with the season. Salt requirements were highest from early July to early August; artificial salting is recommended. Coyotes are the only important predators (on calves). Insect pests and ticks are briefly mentioned.

Life Histories: Hyla ocularis

Harper, Francis. Distribution, taxonomy, nomenclature, and habits of the little tree-frog (Hyla ocularis), American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 22(1), July 1939, pp. 134-149, 5 figs.

Distribution, synonymy, history, habitat, structure and locomotion, voice, measurements. Bibliography of 19 titles. "tiniest of North American frogs."

Life Histories: Leucosticte

Twining, Howard. Foraging behavior and survival in the Sierra Nevada rosy finch, The Condor (W. Lee Chambers, 2068 Escarpa Drive, Eagle Rock, Calif. 50 cents a copy), 42(1), Jan.-Feb. 1940, pp. 64-72, figs. 19-22.

Leucosticte tephrocotis dawsoni; habitat and habits in the northern part of Yosemite National Park; chief enemy, the chipmunk (Eutamias alpinus).

Life Histories: Moose

Bailey, Vernon. Our North American moose, Nature Magazine (1214 Sixteenth St., N. W., Washington, D. C. 35 cents a copy), 33(5), May 1940, pp. 269-272, 3 photos, 1 map.

Popular account of these animals and their habits and life history. Brief description and measurements and a map of distribution of 3 subspecies.

Life Histories: Muskrat

Errington, Paul L. Natural restocking of muskrat-vacant habitats, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 173-185.

Author's abstract: "Spring dispersal of breeding muskrats (Ondatra zibethica) from locally favorable and protected wintering habitats results in a variable degree of repopulation of neighboring areas on which survival is low because of natural emergencies or excessive trapping. This movement, which seems due chiefly to accentuated territorial intolerances, occurs in central and northwestern Iowa from about the middle of March to the first of June, and the distribution of the animals tends to become equalized in attractive environment for some miles away from the areas where they wintered; formerly used muskrat lodges and burrows are often taken over by new-comers, but selection of breeding territories in areas that have not been recently occupied by the species may be rather haphazard except as concerns spatial relationships. The numbers of young actually raised per breeding pair by late fall and early winter ranged from four to 17, with moderate breeding densities being most productive; there is no evidence from the present studies that Iowa muskrats breed in the calendar year of their birth, and movements of animals after the breeding season do not generally appear to be of much consequence in repopulating vacant habitats. Recommendation for the management of the muskrat fur crop on a sustained yield basis is establishment of a system of suitable and well-spaced wintering refuges to insure a spring overflow of muskrats into breeding grounds that are likely to be overtrapped in fall and winter."

Life Histories: Wolverine

Beebe, William. Wolverines and men, Bulletin N. Y. Zoological Soc. (185th St. & Southern Blvd., New York, N. Y. 35 cents a copy), 43(2), March-April 1940, pp. 54-59, 2 figs.

Popular, mostly compiled, account of fable and fact relating to this species. Food items mentioned include: berries, grasshoppers, frogs, mice, squirrels, foxes, hares, beavers, caribous, moose, and deer. The animal has been reported also to kill a puma and a bear.

Life Histories: Woodcock

Merovka, Lawrence J. The woodcock in Louisiana, Louisiana Conservation Review (Dept. of Conservation, Court Bldg., New Orleans, La.), Winter Issue, 1939-40, pp. 10-14, 4 photos.

Wintering areas, habitats, and habits. Only one recent nesting record is regarded as authentic. Description of fire-lighting, now almost entirely suppressed. Headlights have facilitated capture of birds for banding, interesting returns from which are cited. They indicate that the Louisiana wintering birds are summer residents of the northeastern parts of the bird's range (where the species is still most plentiful). Twenty-two birds were found feeding at night in a six-acre field in Louisiana.

Life Histories: Woodcock

Studholme, Alan T., John D. Boule, and Russell T. Norris. A study of Pennsylvania woodcocks, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(11), Feb. 1940, pp. 6-7, 23, 30, 5 figs.

Compiled and original notes relating to various phases of the life history; the authors' observations were made on the oak barrens of Centre County. This region and the bird's courtship activities there are described. The characteristics of singing grounds are given as well as measurements of those areas and their distances apart. A number of the birds were trapped and banded by methods that are described and illustrated.

Management: Attracting birds

McAtee, W. L. Attracting birds, U. S. Dept. of the Interior, Conservation Bul. 1 (Supt. of Documents, Washington, D. C. 5 cents a copy), 15 pp., 12 figs., 1940 (April).

The advantages and disadvantages of attracting birds are discussed, with the conclusion that the practice is advisable in the hands of those who undertake it seriously and take all desirable precautions. Methods are treated under the heads of protecting, landscaping, encouraging nesting, supplying water, feeding, and cultivating food supplies.

Management: Beaver

Carhart, Arthur H. Colorado garners her beaver, American Forests (919 Seventeenth St., N. W., Washington, D. C. 35 cents a copy), 46(2), Feb. 1940, pp. 69-71, 89, 96, 3 photos.

Under protection, beavers once nearly exterminated have increased to an estimated 85,000. Research and management are proceeding simultaneously and animals are being transplanted from areas where they prove troublesome to mountain streams where their dam-building will be of benefit in silt and flood control and water and fish conservation. Fruit crops have been saved by releasing water impounded by beavers into irrigation systems. A water commissioner on the Cimarron River states that his district gets twice as much water as it did before the beavers built numerous ponds in the headwaters of that stream. Plans for harvesting pelts are mentioned and the illicit traffic in beaver skins and efforts to end it are described.

Management: Big game, national forests

Shantz, H. L. A fair policy on big game, National Wool Grower (509 McCormick Bldg., Salt Lake City, Utah), 30(3), March 1940, pp. 13-16, 1 photo (portrait of author).

Big game on national forests has increased from about 200-300 thousand head in 1908 to some 1,340,000 at present, more than doubling every ten years. Certain concentrations present major problems in management, and despite reduction in domestic livestock, it is certain that the game herds must be cut down. Several suggestions for reduction are discussed, of which killing of all age classes and sexes probably would be most desirable and effective, but which encounters much emotional resistance from the public. Herd regulation has been accomplished in some instances, however, the most successful perhaps being that of elk in Utah. "The Forest Service believes that big game is an important resource, to be used and enjoyed, that to be of use it must be harvested as is any other crop and in such a way as to keep it in balance with other uses." Management is a necessity and its objectives are: "(1) To provide and maintain a suitable year-long environment. This in the case of some of the big game species will require cooperation with private land owners, and with state and federal agencies to insure as far as may be practicable suitable winter grazing lands; (2) to restore and maintain appropriate populations. This implies restocking and protection in many areas and increased hunter take in others; (3) to integrate wildlife management with other forms of land use management; (4) to correlate wildlife with social and economic needs, especially those of local communities; (5) to cooperate with state, federal, and other interested agencies to obtain utilization on a sustained yield basis." Deer should be favored, as a rule over elk as being more productive. In the experience of the Forest Service, permanent game refuges have not proved desirable; some should be eliminated and others reduced in size. Management should be in full cooperation with local agencies.

Management: Big game, Ohio

Chapman, Floyd B. A big game policy for Ohio, Ohio Division of Conservation and Natural Resources (Columbus), Bul. 160, 4 pp., mimeographed, 1940.

The increase and spread of deer in Ohio, accompanied by some agricultural damage, demands adoption of a definite policy for management of the animals. Black bears still linger in the State and do some damage. Suggestions are given for the protection, management, and utilization of both species.

Management: Bob-white

Lehmann, Valgene W. Habitat improvements for quail, Texas Game, Fish, and Oyster Commission (Austin), Bul. 17, 11 pp., 7 photos, 1 table, Oct. 1939.

The secret of increasing the number of bob-whites is multiplying adequate covey ranges. These require especially headquarters cover (less in amount than is commonly suspected) and food. Suggestions are given for the construction of brush and pole-shelters, for fencing cover plants and food patches (so necessary in a cattle country), and for planting the food plots. The common deficiencies in cover and suggested remedies are treated in the table. Results from the adoption of methods recommended in the bulletin have been highly favorable. Examples are given.

Management: Bob-white

Montgomery, George A. Texas brings back quail, Capper's Farmer (Topeka, Kansas. 5 cents a copy), 50(11), Nov. 1939, pp. 13, 22, 1 photo.

Results of game management extension by the Texas Agricultural and Mechanical College. In 14 months from inception of the work, demonstration areas embracing 20,000,000 acres had been organized in 172 counties. Demands for aid in the work were more than the available staff could fulfill. Improved public sentiment was considered better than increased warden service and encouragement of natural propagation better than restocking. Examples are given of the practices adopted by farmers and their results. Harvest is regulated, one county permitting a kill of only 33 percent.

Management: Cover

Ford, A. L. Shelterbelting by the Forest Service--A truly conservative program, South Dakota Conservation Digest (South Dakota Game and Fish Dept., Pierre), 7(3), March 1940, pp. 2-3, 15, 4 photos (one a portrait of author)

To date 1,645 miles of standard basic tree belts (from 10-21 rows requiring 23,000,000 trees) have been planted in eastern South Dakota on some 3,000 farms. Survival has averaged around 80 percent. The relation of the shelterbelts to various phases of conservation is discussed. They have elicited great response from small birds and are proving their value as cover for the ring-necked pheasant and Hungarian partridge.

Management: Farm wildlife

Edminster, F. C. Soil Conservation Districts (Soil Conservation Service, Upper Darby, Pa.), 2599a, 11 pp., mimeographed [April 1940].

It is estimated that four-fifths of all the game shot by hunters in the United States comes from privately-owned farms. The number of hunters has vastly increased in the last 20 years and the means of transportation have been so improved that practically all areas are visited. Difficulties in farmer-sportsman relationships have increased and they cannot be said to have been generally and practicably solved by any of the numerous plans that have been tried, locally meritorious though a few of these appear to be. The author contends that to achieve success: "(1) The cooperative must tie in with a functioning farmer organization, and (2) it must function at a low cost per acre for administrative expenses" and he suggests that the Soil Conservation Districts provide suitable operating units. "The Districts are organized and operated by the farmers themselves and district policies are established by them." They are, however, the beneficiaries of cooperation by various public agencies. The organization of a district is described, and suggestions are made as to wildlife management procedures that may be written into cooperative agreements. The Districts afford an opportunity for all conservation interests to work together. Thirty-six States have enacted the requisite basic legislation and there are now more than 125 million acres included in organized districts.

Management: Farmer-sportsman relationship

Cramer, Wilbur M. The hunters of tomorrow and their happy hunting ground, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(12), March 1940, pp. 4-5, 29, 2 photos, 2 reproductions of posters.

Hunters should try to appreciate the aims and problems of farmers and cultivate good will and understanding. Fox hunters have had outstanding success in this respect and small game hunters should emulate their example. The farmer desires acknowledgment of his property rights and assured safety for his family, and for his livestock and other property. These wants are fair and reasonable and hunters must accept them as the basis of negotiations for hunting privileges. Good hunters must cooperate not only by considerate and legal behavior but also by aiding in the elimination of opposed tendencies. Fairness, courtesy, and cooperation are necessary to improvement in farmer-sportsman relationships.

Management: Food patches

Morton, James N. The Pennsylvania game food plot mixture, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 10(12), March 1940, pp. 3, 27, 2 photos.

Experimental plantings in 1937 and practical tests in 1938, resulted in selection of a mixture most suitable for State conditions. Directions for

planting are given. The approved mixture is:

Broom Corn (Dwarf Japanese)	20	pounds
Sorghum (Early Amber)	20	"
Sudan Grass	5	"
Buckwheat (Japanese)	8	"
Sunflower (Small Branching type)	10	"
German Millet	10	"
Japanese Millet	10	"
Broom Corn Millet (or Hog Millet)	5	"
Kaffir Corn (Early Kaffir Corn Variety)	10	"
Rape (Dwarf Essex)	2	"

Management: Fencing

Kelley, M. A. R. Farm fences, U. S. Dept. Agriculture Farmers' Bul. 1832 (Supt. of Documents, Washington, D. C. 10 cents a copy), 57 pp., 64 figs., 10 tables, Jan. (April) 1940.

Without direct relation to wildlife, this bulletin, nevertheless, will be of value to managers who have to deal with fencing. It treats kinds of fences (including electric), fence posts, methods and costs of fencing, gates, lightning protection, and maintenance of fences.

Management: Forest wildlife

Montgomery, W. E. Forest management and wildlife, Forest Leaves (Wayne, Pa.), 29(4), Oct. 1939, pp. 9-10, 21-22.

Essentially the same material as in the author's article on forest management abstracted in **WILDLIFE REVIEW**, No. 24, November 1939, p. 32.

Management: Forest wildlife

Morton, James N. The development of forest areas for wildlife, Forest Leaves (Wayne, Pa.), 29(4), Oct. 1939, pp. 11-12, 1 map.

Diversity of interests in forests that foresters must take into account. One of the strongest of these interests is in wildlife and it must be recognized in connection with forest management. Cutting operations to open up closed canopy woodlands yield various readily salable forest products. Such improvement cuttings have been done on a considerable scale in Pennsylvania. Thinning and releasing also have been extensively practiced; they are of value to the forest as well as to wildlife. Some planting of food patches has been done and large numbers of food and cover yielding woody plants have been set out.

Management: Gallinaceous birds

Lowe, Wm. J. Upland game birds in North Dakota, North Dakota Outdoors (State Game and Fish Dept., Bismarck, N. Dak.), 2(10), April 1940, pp. 3, 6.

Brief popular account of the native and introduced gallinaceous birds noting their present status and the environments to which they are best suited. The importance of corn to pheasants is emphasized. A plea is made for farmer-sportsman cooperation in improving food and cover.

Management: Harvesting

Baumgartner, Luther L. A survey of the 1939 squirrel harvest in Ohio, Ohio Wildlife Research Station (Ohio State University, Columbus), Release 128, 11 pp., 9 tables, mimeographed, March 1940.

Last of 3 reports on this subject, the preceding installments having appeared in 1937 and 1939. Some 1,600 hunters were interviewed. Age classes of the squirrels, adult and juvenile, were about equally represented in the bag. The animals were mostly in good condition; 7, however, had mange. The average seasonal bag was 6.29 squirrels, a drop in hunting success from 1938 attributed to a shortage of squirrels due to a mast crop failure. Sex ratio of those shot varied by locality but for the total kill was about 52:48. Crippling losses were about 10 for every 100 fox squirrels, and 18 for every 100 gray squirrels, bagged. Shot-guns caused more crippling than rifles. The tables summarize details of the inquiry with respect to the points mentioned as well as to portion of the open season utilized by hunters, comparative kills of gray and fox squirrels in each of 6 districts, hunter success in the same areas, hunters' opinions as to abundance of squirrels compared to that of the 1938 season, etc. Bibliography of 9 titles.

Management: Introduction

Hicks, Lawrence E. The role of exotics in the Ohio Valley and the lower Great Lakes Region, Ohio Wildlife Research Station (Ohio State University, Columbus), Release 133, 4 pp., mimeographed, March 1940.

In environment extensively altered by man, exotic species may prove superior to the native; at any rate they should be judged on performance rather than by prejudice. The author notes the preponderance of introduced species in agriculture, the success of which is in fact due largely to the utilization of the most adaptable plants and animals from all parts of the earth. Game crops, also, of whatever origin must be utilized. Unfilled ecologic niches may possibly be stocked with exotics, suggestions for the choice of which are given. Those which cannot find a vacant habitat are not likely to become established. In highly cultivated areas, the opportunity for exotics is likely to be greatest. Hunting pressure also is most severe there and it can be met best in the long run by use of the already adapted exotic species.

Management: Inventory

Anon. Annual wildlife statistics, 1939, U. S. Forest Service, Region 1 (Missoula, Mont.), 22 pp., mimeographed.

Estimates for the National Forests in Region 1 (Montana 12, Idaho 7, Washington 1) of big game animals and the numbers killed by men and by predatory animals, the numbers of predatory animals and of those killed on the forests and adjacent lands, the populations of fur animals, report on law enforcement, relative populations of game birds, statistics on State and Federal game areas and their utilization for grazing and report on game salting and upon fish planting.

Management: Inventory

Anon. Wildlife report, Region Six, 1939, U. S. Forest Service, Region Six (Portland, Oreg.), 21 pp., 10 tables, mimeographed, March 1940.

The tables present data that are also discussed in the text on the big game census, estimates of the numbers of fur animals, predators, game birds, game animals killed by hunters and by predatory animals, estimated number of hunters, trappers, and fishermen on the forests, statement of game law enforcement, list of wildlife improvements and record of fish distribution and beaver transplanting.

Management: Inventory

McLean, Donald D. Counting our game, California Conservationist (State Dept. of Natural Resources, Sacramento, Calif. 10 cents a copy), 5(1), Jan. 1940, pp. 18, 23.

Semi-popular account relating to deer, bighorn, quail, and waterfowl. Figures are given on the number per square mile of 6 kinds of deer.

Management: Planting, seed cleaning

Steavenson, Hugh A. The hammer mill as an important nursery implement, Journ. Forestry (Mills Bldg., Washington, D. C. 50 cents a copy), 38(4), April 1940, pp. 356-361, 3 photos, 2 tables.

Utility of the mill in cleaning pulp surrounded seeds and in threshing dry-fruits. The tables record the efficiency of the machine with various types of seeds, and the costs of cleaning. With change of part of the apparatus, it may be used also as a scarifier. Bibliography of 6 titles.

Management: Planting for wildlife

[Massey, A. B.] Woodland borders can be both beautiful and productive, Virginia Wildlife (Blacksburg, Va.), 3(8), April 1940, p. 6.

Border vegetation is useful in preventing erosion, and excessive drying of the forest floor as well as in furnishing cover and food for wildlife. List of nearly 30 groups of plants suitable for planting along the woodland margin with notes on their soil requirements.

Management: Planting for wildlife and erosion control

Davison, Verne E. Protecting field borders, U. S. Dept. of Agriculture Leaflet 188 (Supt. of Documents, Washington, D. C. 5 cents a copy), 8 pp., illus., Dec. 1939 (1940).

Treatment of field borders that answers agricultural requirements and also provides much food, cover, and nesting protection for wildlife. Lespedeza sericea is chiefly recommended for planting; preparation, maintenance, and utility of field borders are discussed.

Management: Planting for wildlife and erosion control

Hopkins, Ralph C. The farmer and wildlife, Wisconsin Conservation Bulletin (Wisconsin Conservation Dept., Madison), 5(3), March 1940, pp. 67-70.

Essentially a statement of practices by Wisconsin farmers that are reimbursable under the Federal agricultural adjustment program.

Management: Planting for wildlife and erosion control

Hughes, C. E. New homes for wildlife, Farmers' Guide (Huntington, Ind.), 96(4), Feb. 24, 1940, p. 87, 1 photo.

Mainly an account of farmer cooperation with the Soil Conservation Service near Peoria, Illinois; work not advanced enough for results to be known. Brief discussion of farmer-sportsman relationship.

Management: Sandhill area in North Carolina

Leffelman, L. J. Nature again has her way on the Poinsett project, Soil Conservation (Supt. of Documents, Washington, D. C. 10 cents a copy), 5(8), Feb. 1940, pp. 207-209, 2 photos.

A sandhill region in Sumter County, North Carolina, devastated by lumbering, war, and parasitic agriculture. Game once abundant and widespread was decimated and forced into bottomland swamps. Reforestation and improved land management produced a six-fold increase in quail and brought back the wood duck, once almost extirpated. Hunting and fishing are prohibited but will be permitted again when a surplus of fish and game has been developed.

Management: Seed collecting and handling

Mirov, N. T., and Charles J. Kraebel. Collecting and handling seeds of wild plants, Civilian Conservation Corps Forestry Publication No. 5 (Supt. of Documents, Washington, D. C. 10 cents a copy), 42 pp., tables, illus., May 1939.

Suggestions as to collecting and preserving material, extracting and cleaning seeds when necessary, storing and germinating them (both with and without special treatment), propagating wild plants by vegetative means, and establishing a wild-plant nursery. Tables list some wild plants that can be propagated vegetatively, and give seed and cultural data for numerous western species. Two special bibliographies cite books on wild plants for western States and publications useful in connection with the propagation of plants.

Management: Soil conservation in relation to wildlife management

Bennett, Hugh H. Soil Conservation (McGraw-Hill Book Co., Inc., New York, N. Y. $6.00 a copy), xviii+993 pp., 1939.

A full exposition of this branch of conservation by its leader. A chapter on "Wildlife and soil conservation" (pp. 568-595, figs. 236-251), presumably by other hands, emphasizes the joint dependence of soil and wildlife conservation upon vegetative cover. Types of cover and their utility are discussed. The original abundance of wildlife is referred to and the effect upon it of human occupation of the land, especially that characterized by clean farming, are pointed out. Depletion has made the residue of wildlife more valuable and its conservation is an important objective for economic, biologic, and esthetic reasons. As wildlife management and soil conservation employ the same tools, it follows that with appropriate direction, the objectives of both may be attained through the same operations. These may be applied to farming and water and soil conservation in ways that are described and through the use of materials that are suggested.

Management: Stocking, beaver

Fox, Adrian C. Beavers as water conservationists, North Dakota Outdoors (State Game and Fish Dept., Bismarck, N. Dak. 5 cents a copy), 2(9), March 1940, pp. 5-6, 4 photos.

Notes on the increase (6 to 40) and spread (4-6 miles) of some small plantings and their impoundment of water. Compared to man-made structures, beaver dams are very cheap. They are of value for stock-watering, sub-irrigation, and water conservation.

Management: Water supply

Johnson, Carlock E. Waterholes for wildlife, National Park Service Region III (Santa Fe, N. Mex.), 2(2), April 1940, pp. 9-11 (mimeographed).

Water requirements of deer in the Southwest; in some areas development of watering facilities might double the wildlife. Suggestions as to improvement of springs and seeps. The article also lists a number of the most valuable wildlife food plants of the Southwest.

Natural History: Birds of Montana

Meydemeyer, Minton, K. D. Swan, and E. F. Rapraeger. List of the birds of western Montana, U. S. Forest Service, Northern Rocky Mountain Region (Missoula, Mont.), Field Notes on Wildlife, 16 pp. (mimeographed), 1940.

Very briefly annotated list of 241 species and subspecies observed by the authors with supplement of 14 forms reported by others in 6 publications that are cited in a terminal bibliography.

Natural History: Distribution

Kroeber, A. L. Cultural and natural areas of native North America, Univ. of California Publications in American Archaeology and Ethnology (University of California Press, Berkeley) 38, xii+242 pp., 28 maps, 1939.

Of interest to biologists especially for its discussion of vegetational areas (a compilation from 10 leading sources with concordance) and of physiographic areas, the former illustrated by 4, and the latter by 1, folding maps. These summarized, as well as separate climatic and other distributional factors are applied to an analysis of cultural types of American aborigines.

Natural History: Herpetology of Florida

Carr, Archie F., Jr. A contribution to the herpetology of Florida, Univ. of Florida (Gainesville) Biol. Science Series, 3(1), Jan. 1940, 118 pp.

History of the study of herpetology in Florida; discussion of derivation of the fauna and of its habitat distribution; key to the forms treated; and annotated list of 162 species and subspecies of reptiles and amphibians. Bibliography of 5-1/2 pages and full index. A substantial and valuable publication.

Natural History: Mammals of Iowa

Hicks, Ellis A., and George O. Hendrickson. Fur-bearers and game mammals of Iowa, Iowa Agr. Expt. Sta. Bul. P3 (N.S.), pp. 115-145, 2 pls., 10 figs., Feb. 1940.

Brief popular account of 16 species with illustrations by Sid Horn (including cover design) of 11 of them. The 2 plates diagram the tracks of 8 species. Most is said about food habits and fur and other economic values. There are sections on the care and handling of furs and on traps and trapping, together with a glossary of terms used in the fur trade.

Natural History: Mammals of Oklahoma

Blair, W. Frank. Faunal relationships and geographic distribution of mammals in Oklahoma, American Midland Naturalist (Notre Dame, Ind. $1.00 a copy), 22(1), July 1939, pp. 85-133, 1 map, 2 tables.

History of the study of mammals in the State, discussion of biotic districts (with lists of their species) and of factors affecting mammalian distribution. Annotated list of 99 species and subspecies. Bibliography of 41 titles. "North-south zonation x x x which might possibly be attributable to the effects of temperature, is far overshadowed by the east-west zonation, which results indirectly from differences in the amount of rainfall."

Natural History: Mammals of Quebec

Anderson, R. M. Mammiferes de la Province de Quebec, Societe Provancher (140 rue St. Jean, Quebec) Rapp. A nn. 1939 (1940), pp. 37-111, 1 map.

Revision, in French, of the list abstracted in WILDLIFE REVIEW, No. 21, May 1939, p. 17, the number of forms treated being raised (6) to 132. A sketch of the author, with portrait, is given on pp. 34-36.

Predation

Tyler, Bruce P. Predators in their relation to bird life, The Migrant (672 N. Belvodere, Memphis, Tenn.), 10(4), Dec. 1939, pp. 67-70, 1 table.

Function of predators in contributing toward balance illustrated by their use, natural and artificial, in insect control. The tabulation shows the frequency of occurrence of the principal prey items in stomachs of 8 species of hawks reported upon by the Biological Survey. Quotations are given from various authors as to the role and value of predators.

Predation: Armadillo vs. quail

[Gowanloch, James N.] Armadillos invading Louisiana are not quail enemies, Louisiana Conservation Review (Dept. of Conservation, Court Bldg., New Orleans, La.), Winter Issue 1939-40, pp. 7, 50, 1 fig.

Armadillos have been invading Louisiana for at least 10 years and have crossed the Mississippi River; limits of their known range are indicated. Damage to quail nests by cotton rats is often attributed to armadillos. The latter, however, are highly insectivorous and it is doubtful that they do much damage to quail. Investigations are being continued.

Predation: Hawks

Gowanloch, James N. Louisiana hawks are valuable, Louisiana Conservation Review (Dept. of Conservation, Court Bldg., New Orleans, La.), Winter Issue, 1939-40, pp. 23-34, 4 pls., 1 photo.

Discussion of groups of Louisiana hawks and vultures, their identification, economic status, and legal protection. The article embraces an annotated check list of the birds, a digest of recent articles on predation, and a bibliography of 29 titles. The weight of evidence is certainly against the teach-

ings of the "vermin" control school. The plates are reproductions of Peterson's excellent pictures made for the National Association of Audubon Societies.

Propagation: Partridge, Chukar

Barger, B. A. Breeding and rearing of chukar partridges, Wisconsin Conservation Bulletin (Wisconsin Conservation Dept., Madison), 5(2), Feb. 1940, pp. 62-66, 1 fig.

Introductory paragraphs on native range, habits, and description, followed by a summary of Wisconsin experience, in sexing, penning, and breeding the birds, care of eggs, housing and feeding the chicks, and controlling diseases. Some 2,000 birds have been experimentally planted in Wisconsin and the results are being carefully observed for guidance of future procedure.

Propagation: Wild turkey

Fluke, Wm. C. Propagation wild turkeys in the wild, Pennsylvania Game News (Pennsylvania Game Commission, Harrisburg. 10 cents a copy), 11(1), April 1940, pp. 4, 32, 2 photos.

Birds propagated on game farms would not "go wild", so the penning of hens accessible to wild toms was tried. The experiment, which is described, has resulted in notably wilder progeny.

Research: Banding pheasants

Olds, Hayden M. Ohio pheasant banding results 1930-1939, Ohio Division of Conservation (Columbus), Bul. 101, 14 pp., 7 figs., tables (mimeographed), March 1940.

History of miscellaneous pheasant banding activities, 1930-39, with the following summary: "(1) Wild trapped birds as well as artificially propagated birds used for restocking are taken in greatest number by hunters on the opening day of the hunting season; (2) wild trapped birds will return at least two miles to a refuge and because of this should be stocked at a greater distance in order to avoid a reconcentration; (3) the average distance traveled by banded wild trapped pheasants after being stocked, based on the travels of 56 such birds x x x is between 1-1/2-2 miles. It must be kept in mind that all of these returns are based on birds trapped and released in the same county (Wood); (4) no conclusion on life span or x x x ability to survive as compared to releases of artificially propagated birds is offered." Results for the intensified banding operations of 1939 are given separately. In that year, there was a staggered hunting season which, apparently, increased the kill 8.8 percent. "The longer the period of time that game is banded and released before the hunting season, the smaller the percentage of returned bands." The figures indicate the daily kill of pheasants in 4 regions of the State, and the accompanying legends state the number of birds banded, the percentage of returns, the average distance traveled, percentage of birds killed during the first 4 days of the open season, and other details. The distance traveled varied considerably by regions, a result for which interpretation is offered in the text.

The grand total of bands applied in 1939 was 10,333, that of returns 964, a percentage of 9.3.

Research: Food habits

Davison, Verne E. A field method of analyzing game bird foods, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 105-116, 7 tables.

Author's abstract: "The paper describes a field method which deviates from usual laboratory methods of determining game bird foods in order to facilitate the analysis of hundreds of crop contents. The study represents a winter period of from 4 to 6 months and is being conducted by Soil Conservation Service biologists in the southeastern United States. The relative significance of plants occurring in various agricultural habitats is determined by the contents of crops rather than of gizzards. A study of 100 to 200 crops for each period of 3 or more years is required to reach dependable conclusions. Examples are taken from more than 3,000 bobwhite crop records to illustrate the type of information obtained. The results of the entire study will be published later and their application may be varied for guidance of wildlife field workers who intend to manipulate plants for the benefit of a certain species of game bird."

Research: Marking beavers

Aldous, Shaler E. A method of marking beavers, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 145-148, 2 figs.

Author's abstract: "The marking of animals for future recognition is an important phase of any ecological study. With the hope of developing a usable method for beavers, ear tagging, tattooing of the tail and the webs of the hind feet, and punching holes in the webs were all tested. Ear tagging and tattooing were both unsatisfactory, but web punching proved to be a usable technique. The method employed was to punch holes in the webs of the hind feet with the three-eighths-inch cutter of a hand-operated leather punch. Each web was given a numerical value so that by punching one or more webs the desired number could be produced. Two codes are illustrated, one simple for use when only a few animals are to be marked, the other slightly more complicated but more satisfactory when larger numbers are involved. The same technique should be suitable for marking other web-footed species."

Research: Muskrat

Forbes, Thomas R., and Robert K. Enders. Observations on corpora lutea in the ovaries of Maryland muskrats collected during the winter months, Journ. Wildlife Management (Frank C. Edminster, Soil Conservation Service, Upper Darby, Pa. 75 cents a copy), 4(2), April 1940, pp. 169-172, 1 table.

Authors' abstract: "Evidence from histological examination of the ovaries, and especially of the corpora lutea, of 119 muskrats trapped in Maryland during the winters of 1938 and 1939 indicates that during these years the first ovulatory cycle of the annual breeding period occurred between the early part of February and the middle of March and that a second ovulatory cycle promptly ensued."

Research: Vibrometer

Odum, Eugene P., and S. Charles Kendeigh. The cardio-vibrometer: A new instrument for measuring the heart rate and other body activities of animals, Ecology (Prince and Lemon Sts., Lancaster, Pa. $1.50 a copy), 21(1), Jan. 1940, pp. 105-106, 1 fig.

Description, illustrations, suggestions as to use.

WILDLIFE LEAFLETS

Issues of interest to wildlife managers additional to those previously mentioned are listed below. Copies of these mimeographed leaflets can be obtained from the Biological Survey, U. S. Department of the Interior, Washington, D. C.

BS-150. Suggestions for bird field study, by May Thacher Cooke, 7 pp., January 1940.

A revised edition of BS-76 (December 1936). Popularity of the study; availability of aids; time to begin; equipment; where and when to go; field identifications; note keeping; significance of the study; organizations; list of helpful books and pictures; addresses of their publishers, and prices.

BS-152. Suggested action program for sportsmen's organizations, 5 pp., February 1940.

Opportunities for cooperation in educational programs, in improving environment for wildlife, in restocking operations, in emergency winter feeding, and in the activities of State and Federal control and law enforcement programs.

BS-156. Ornamental woody plants attractive to birds, by Myer Katz, 18 pp., March 1940.

General considerations as to attracting birds with references to available publications. Alphabetical list of the more important genera of woody plants with notes on their ornamental value and their utilization by birds.

NOTES AND NEWS

A popular account of wildlife disease investigation by the Biological Survey with special mention of botulism, sylvatic plague, and tularemia appeared under the title of "Wildlife Doctor" in the National Sportsman for May 1940 (84(5), pp. 11, 26-27, 4 photos). The Doctor referred to is Dr. J. E. Shillinger, a portrait of whom is one of the illustrations.

Those who fear that the standard of wildlife conservation in the national parks may be threatened by assignment of the Wildlife Division of the National Park Service to the Biological Survey should be reassured by the terms of the memorandum of agreement signed by heads of the organizations concerned and approved by the Secretary of the Interior. It is herewith quoted:

"Among the chief functions of the National Park System has been that of preserving representative examples of the primitive wildlife of America. If the Department of the Interior is to continue to carry out this responsibility for the benefit of future generations as well as that of the present, the units of the park system must be administered in accordance with specific, distinctive principles. Believing that the objective of restoring and perpetuating the original fauna and its environment requires and is worthy of extraordinary measures, we advocate continuance of the established park policy of wildlife management:

"No management measure or other interference with biotic relationships shall be undertaken prior to a properly conducted investigation.

"Every species shall be left to carry on its struggle for existence unaided, as being to its greatest ultimate good, unless there is real cause to believe that it will perish if unassisted.

"Where artificial feeding, control of natural enemies, or other protective measures, are necessary to save a species that is unable to cope with civilization's influences, every effort shall be made to place that species on a self-sustaining basis once more; whence these artificial aids, which themselves have unfortunate consequences, will no longer be needed.

"No native predator shall be destroyed on account of its normal utilization of any other park animal, excepting if that animal is in immediate danger of extermination, and then only if the predator is not itself a vanishing form; when control is necessary it shall be accomplished by transplanting or, if necessary, by killing offending individuals, not by campaigns to reduce the general population of a species.

"Species predatory upon fish shall be allowed to continue in normal numbers and to share normally in the benefits of fish culture.

"The numbers of native ungulates occupying a deteriorated range shall not be permitted to exceed its reduced carrying capacity and, preferably, shall be kept below the carrying capacity at every step until the range can be brought back to original productiveness.

"Any native species or subspecies which has been exterminated from the park area shall be brought back if this can be done, but if said species or subspecies has become extinct, no related form shall be considered as a candidate for reintroduction in its place.

"Any exotic species which has already become established in a park shall be either eliminated or held to a minimum provided complete eradication is not feasible; and the possible invasion of the parks by other exotics shall be anticipated and steps taken to guard against the same.

"Presentation of the animal life of the parks to the public shall be a wholly natural one.

"No animal shall be encouraged to become dependent upon man for its support.

"Problems of injury to the persons of visitors or to their property or to the special interests of man in the parks, shall be solved by methods other than those involving the killing of the animals or interfering with their normal relationships, where this is at all practicable."

(Sgd) Arno B. Cammerer
Director, National Park Service

(Sgd) Ira N. Gabrielson
Chief, Bureau of Biological Survey

Approved: Dec. 4, 1939

(Initialed) H. L. I.
Secretary of the Interior

"Your National Parks--and you" is the title of a popular article by Victor H. Cahalane in Nature Magazine (33(5), May 1940, pp. 257-265, 303, 11 photos. 1214 Sixteenth St., N. W., Washington, D. C. 35 cents a copy), that gives attention to the care of wildlife among other problems of the Park Service in the most difficult part of its job, namely that of getting along with the great American public.

A press release of April 16 sums up the achievements of the Missouri Conservation Commission to date; it states that in addition to the organization of the department, the manning of the staff and the consideration and adoption of fundamental principles, there are now being carried on projects in game and fish development on 1,156 areas, aggregating 1,741,853 acres in cooperation with 22,311 owners in 99 counties. In the field of education there are in operation

projects in which fifty thousand farm youths of the state are actively engaged.

The Fact Finding Committee of the Montana State Fish and Game Commission (B. L. Price, Chairman) has issued a "Preliminary Survey of Research and Fact Finding Work done or in progress affecting the Wildlife of the State of Montana" (38 pp. mimeographed, Helena, Mont., 1940). In general the publication is a list of projects, details being given in only a few cases relative to animal parasites and diseases.

Two recent releases of the Ohio Wildlife Research Station (Ohio State University, Columbus) not abstracted may be of interest to readers of WILDLIFE REVIEW. The first is: "Wildlife Management Districts of Ohio" by E. L. Wickliff and Lawrence E. Hicks (Release 134, March 1940) which discusses physical conditions, wildlife, and hunting problems of each of the 7 regions under which the game administration of the State is conducted. The second publication referred to is a list and index to Releases 1-120 of the Station (No. 120a, February 1940).

Dartmouth College (Hanover, N. H.) has employed a naturalist (Richard L. Weaver) who gives his full time to extra curricular activities with the students and faculty. His duties are explained in the Bulletin of the Massachusetts Audubon Society (66 Newbury St., Boston, Mass., Jan. 1940), and the results achieved by the Dartmouth Natural History Club are detailed in the mimeographed Annual Report for 1939, presumably obtainable from Dr. Weaver at the College.

The British Trust for Ornithology has issued in bound form a collection of reprints (1935-9) mostly relating to population studies. Some of them are: "The Breeding Bird Population of British Heaths and Moorland," by David Lack; "A Census of Short-eared Owls," by T. Russell Goddard," two papers on food habits of the little owl by Miss A. Hibbert-Ware, and one on "The Habitat Distribution of British Woodland Birds," by David Lack and L. S. V. Venables. The volume includes also the article by J. C. F. Fryer on bird destruction of buds of trees and shrubs that was abstracted in WILDLIFE REVIEW, No. 24, November 1939, p. 18.

There are 23 different articles in all at the bargain price of 6 shillings. Obtainable from the Director, Edward Grey Institute of Field Ornithology, 39 Museum Road, Oxford, England.

Those interested in the value of weed fallow in tobacco production may consult a discussion of the matter in the Journal of Agricultural Research (59(11), December 1, 1939. Supt. of Documents, Washington, D. C. 15 cents a copy). In an article entitled,"Tobacco following bare and natural weed fallow and pure stands of certain weeds" (pp. 829-845, 5 figs., 9 tables), Messrs. W. M. Lunn, D. E. Brown, J. E. McMurtrey, Jr., and W. W. Garner report that

tobacco grown after weed fallow possesses in large measure those desirable characteristics of the crop grown on virgin land. Tobacco following ragweed and horseweed was markedly superior to that following bare fallow. Results of tests of other plants also are reported and a bibliography of 12 titles is given.

A directory of 1940 summer camps and biological stations is given in Turtox News for March (Vol. 18, No. 3, General Biological Supply House, Inc., 761-763 East 69th Place, Chicago, Ill.). It is arranged according to sections of the country and includes 50 entries for the United States. There are 6 also for Canada.

Trend of publication in the wildlife management field, 1936-39, inclusive. (Summarized from abstracts that have appeared in WILDLIFE REVIEW)

Subjects	Number of publications			
	1936	1937	1938	1939
Conservation	31	26	34	25
Control	20	17	15	18
Cycles	11	12	7	7
Destruction	9	8	10	10
Diseases and parasites	45	60	83	95
Ecology	46	32	70	48
Economics	4	6	5	4
Education	9	14	15	21
Food habits	42	43	45	73
Life histories	32	34	58	73
Management	152	111	169	161
Natural history	9	5	24	38
Predation	4	11	17	6
Propagation	27	13	17	21
Research	9	19	25	32

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